1894MNRAS..55...17L

The formula for precession in distance may be put in the form

$$\frac{\Delta\sigma}{\sigma \sin 1''} = h \cos(\mathrm{H}+\alpha)\cos\delta - i\sin\delta$$

$$= h\cos(\mathrm{H}+\alpha)\sin(90^\circ-\delta) - i\cos(90^\circ-\delta)$$

$$= \mathrm{Q}'(1+y) - \mathrm{I}$$

where Q′ and I are to be taken from the table for declination $=90^\circ-\delta$.

In position-angle we have

$$\Delta p = g\sin(\mathrm{G}+\alpha)\sec\delta + h\sin(\mathrm{H}+\alpha)\tan\delta$$

$$= g\sin(\mathrm{G}+\alpha)\tan\delta\operatorname{cosec}\delta + h\sin(\mathrm{H}+\alpha)\sec\delta\,.\,\sin\delta$$

$$= 15\,\mathrm{P}(1+x)\operatorname{cosec}\delta + 15\,\mathrm{Q}(1+y)\sin\delta.$$

Cape of Good Hope:
1894 *October* 10.

Note on the Binary Star κ Pegasi (β 989). By T. Lewis, Royal Observatory, Greenwich.

(*Communicated by the Astronomer Royal.*)

κ Pegasi	R.A.	$21^{\mathrm{h}}\ 39^{\mathrm{m}}\ 53^{\mathrm{s}}\cdot4$	1895·0
	N.P.D.	$64^\circ\ 58'\ 10''\cdot7$	

The small companion to κ *Pegasi* was noted in 1776 by Sir W. Herschel, and has been frequently measured as Σ 2824.

In 1880 August Mr. Burnham found the large star to be a close double (β 989). In the *Monthly Notices*, 1891 March, he gives all the measures and deduces a period of 11·13 years, thus making it the most rapid binary star known.

He remarks: "The extreme difficulty of measuring so close a pair seems to have deterred other observers, with a single exception, from doing anything with it. . . . It is unfortunate that we have so little to represent the extraordinary motion of this pair. . . . Since I have been at Mount Hamilton I have measured the close pair each year with the 36-inch refractor. During the measures of the past year it was extremely difficult, and was a severe test of the power of the great telescope with the very best atmospheric conditions."

This note naturally induced an inspection with the 28-inch refractor of the Royal Observatory, Greenwich, which showed them distinctly separated with a power of 1030, and our measures appear to confirm the remarkably short period.

1894MNRAS..55...17L

The measures on the individual nights are :—

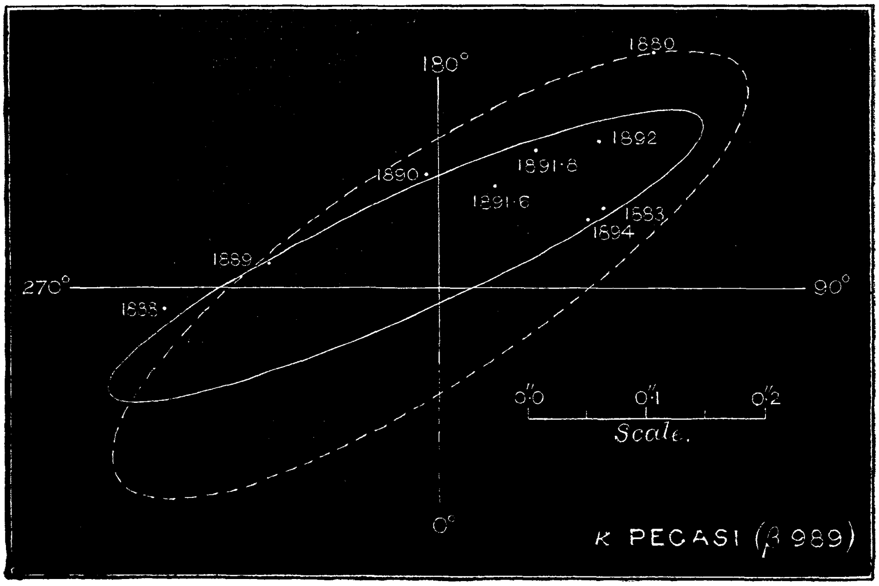
Date.	Position angle.	Distance.	Power.
1894, Oct. 27	108°·5	0″·114	840
„ 29	122·1	0·157	840
Nov. 6	115·0	0·133	1030
„ 21	113·6	0·152	1030

the position-angles being in each case the mean of five settings. On Oct. 27 and 29 the distances were estimated in relation to the thickness of the micrometer wires, the values for which on careful determination were found to be 0″·114 and 0″·134. On the other nights direct measures were made.

The following are all the measures, and they are plotted down on the same scale as employed by Mr. Burnham in the paper quoted above :—

1880·68	137°·9	0″·27	β	4*n*
1883·02	116·0	0·16	En.	1*n*
1887·78	274·7	0·23	β	3*n*
1889·51	262·3	0·14	β	4*n*
1890·57	187·1	0·10	β	4*n*
1891·61	150·0	0·10	β	3*n*
1891·81	144·6	0·13	β	4*n*
1892·39	132·8	0·18	β	4*n*
1894·83	114·8	0·14	L	4*n*

In the diagram shown below the dotted ellipse is that proposed by Mr. Burnham from his observations up to 1890, which would seem to want some modification to bring it more into accord with the recent measures. The narrower ellipse seems a nearer approximation to the apparent orbit.



1894MNRAS..55...17L

The period is very nearly 11·6 years.

Mr. Burnham gives the magnitudes 4·3 and 5·0. As regards the distant Struve companion, the measures show rectilinear motion in the direction 72° of 0″·039 per annum; and if this is regarded as the proper motion of *κ Pegasi*, we have for this star a P.M. in

$$\text{R.A. of} \quad +0^s\cdot0025$$

and in

$$\text{N.P.D. of} \quad -0''\cdot012$$

The measures are for Σ 2824—

$$1894\cdot83 \qquad 298^\circ\cdot8 \text{ and } 12''\cdot23.$$

The P.M. used for *κ Pegasi* is R.A. 000 and N.P.D. −0″·010 (Auwers). Bradley did not observe it in R.A.; but the Piazzi place gives P.M. in R.A. of + 0s·0021.

Royal Observatory, Greenwich:
1894 *November* 2.

Since the above note was written I have found in *Popular Astronomy*, 1894 April, a discussion of this pair by Mr. Burnham, using his later measures, and another by Mr. Barnard, made with the 36-inch Lick refractor. His ellipse practically agrees with the one here given. The period he makes 11·37 years.

1894 *November* 8.

On the Orbit of η Cassiopeiæ (Σ 60).

By T. Lewis.

For various reasons this binary star is very interesting, and a better knowledge of its orbit seemed desirable. The following elements and notes are submitted in the hope that double-star observers will give it some attention.

The components are yellow and purple, and of the 4th and 7·6 mag. respectively.

The unusually large proper motion is in

$$\text{R.A. } +0^s\cdot1346 \text{ and in N.P.D. } +0''\cdot481.$$

Its parallax has been determined by

Otto Struve	+0″·096	from	measures of	distance
,, ,,	+0·373	,,	,,	position
Schweizer	+0·202	,,	,,	distance
,,	+0·139	,,	,,	position